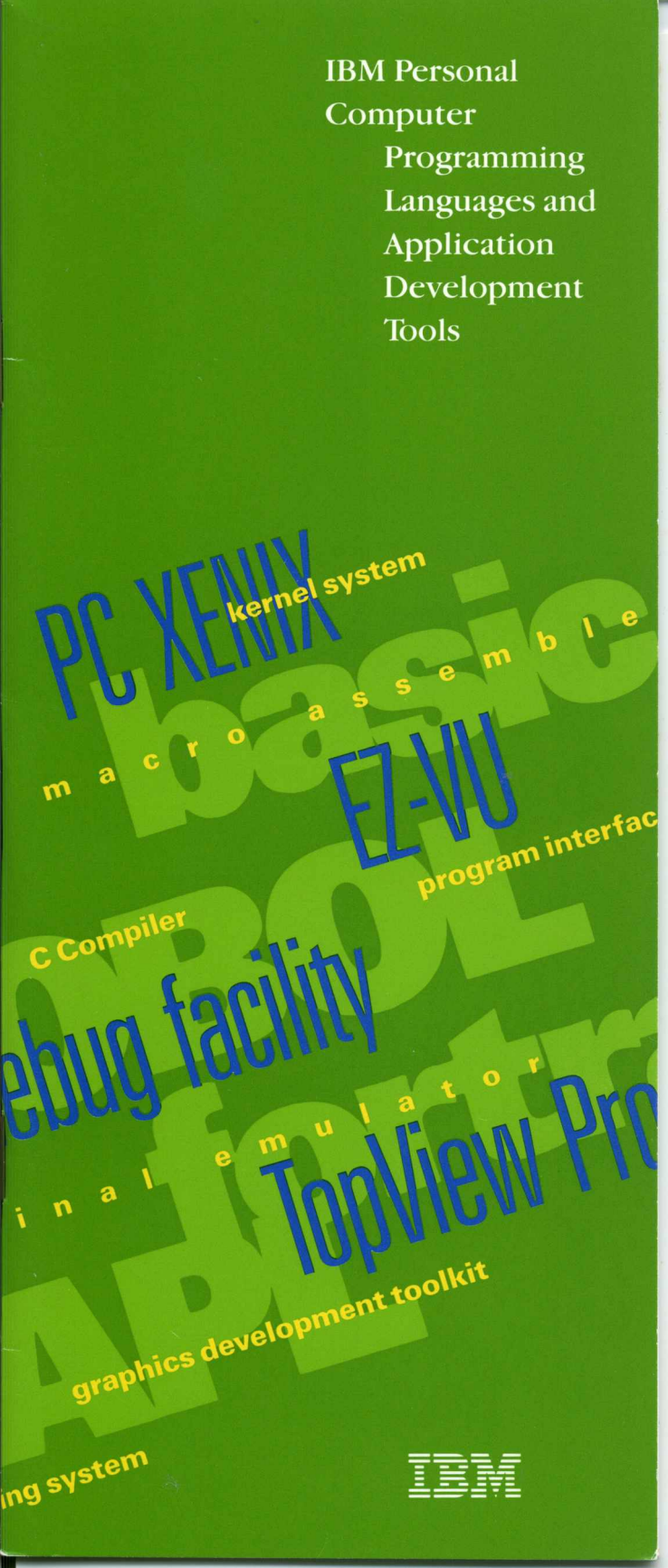
IBM Personal Computer Programming Languages and Application Development Tools



Discover new ways to harness IBM PC productivity

Right from the start, individuals and organizations have looked to IBM Personal Computers for ways to improve their productivity. And in today's fast-paced business world, that's even more true. That's why many people are seeking new ways to harness the power —and performance—of their systems.

One of the ways they've discovered is by designing their own custom applications. Applications tailored and shaped to fit their own needs and job functions—whether in a business, professional, scientific, or academic environment.

IBM can help them—and you—meet this need with an impressive range of programming languages and application development tools. These enable programmers, application developers, or others with programming skills to create programs as individual as they are.

You'll find brief descriptions and highlights of each of these languages and tools inside this brochure. And to help you locate the products that suit your needs best, we've separated these offerings into four categories. They are:

- ***Programming Languages***—from easy-to-use BASIC Compiler Version 2.00 to high-level IBM PC Professional FORTRAN
- ***Professional Color Graphics Tools***—such as Graphics Development Toolkit Version 1.10 and Plotting System to help create new ways to present and analyze information
- ***Application Development Tools***—including the enhanced TopView Programmer's ToolKit Version 1.10 and the new IBM Voice Communications Application Program Interface Reference
- ***Technical Reference Manuals***—a valuable library for program designers, programmers, application developers, and engineers

If you've been looking for new ways to get more out of your IBM Personal Computer, the languages and tools in this brochure can help. The "System Requirements Chart," beginning on page 19, lists the hardware and software needed to operate these programs. See them for yourself wherever IBM Personal Computer products are sold. You'll discover the many ways that programming languages and tools can help you increase your productivity.

Programming Languages

Speed, enhance, and simplify programming. Design a spreadsheet . . . build a model . . . create a data base. Programming languages enable you to develop these kinds of applications and more. However, different languages are suited to different types of tasks, and finding the right one can depend on your specific needs—and your background.

That's why IBM offers a wide range of programming languages for personal computers—a range that includes today's important languages. All-purpose BASIC. High-performance C. Businesslike COBOL. Professional-level FORTRAN. And more.

Each of these IBM PC versions reflects the language's distinct "personality." And that can translate into more flexible programming and application development for you.

What's more, since all were designed specifically to run under the IBM Disk Operating System (DOS), they can help you gain a greater advantage from your system's power and performance.

BASIC Compiler Version 2.00

Speed through a variety of applications. This newest IBM PC version of BASIC is easy to learn and well-suited for engineering, mathematical, statistical, and business applications. With it, you can develop programs that will run within an IBM Personal Computer local area network (LAN) or TopView's multitasking environment.

The Compiler permits you to run BASIC programs—written and tested with the appropriate level of the BASIC Interpreter. This includes Disk and Advanced BASIC, both of which are part of the IBM Disk Operating System (DOS). It also enables you to take advantage of the expanded graphics capabilities of BASIC Interpreter Version 3.20.

More valuable features. With BASIC Compiler Version 2.00 you can:

- Use improved program control structures
- Speed through application development with large numeric dynamic arrays
- Access files randomly or in sequence using ISAM library subroutines
- Link separately compiled BASIC modules with a BASIC main program

C Compiler

A powerful, general-purpose language. C Compiler is a programmer's tool that allows you to use the powerful C language to develop high-function, general-purpose programs for a personal computer.

C Compiler is DOS-based. It can also run in an IBM Personal Computer local area network environment to help optimize resources and information-sharing.

What's more, with the C Compiler, you'll find you can:

- Use multiple warning levels to help avoid syntax errors, unwanted data conversions, and type mismatches
- Take advantage of mixed model programming and interrupt support for DOS and BIOS calls
- Benefit from support for four memory models
- Use the interactive symbolic debug feature

Help in handling many applications. Designed to handle a wide range of tasks, the C Compiler can create program modules—large or small, simple or complex, scientific- or business-oriented—for systems or applications.

IBM PC Professional FORTRAN

A high-performance language for scientists and engineers. IBM PC Professional FORTRAN allows engineers, scientists, and others to configure workstations for high-performance computation, program development, and the support of large programs and arrays.

Using IBM PC Professional FORTRAN enables you to:

- Take advantage of easy migration to mainframe-level programs with the full-function ANSI 77 compiler and library
- Benefit from faster execution times made possible by the compiler's efficiency and code optimization
- Work with programs or data segments larger than 64KB
- Use high-speed floating-point computations with the IEEE standard implemented by IBM 8087 or 80287 Math Co-processors

IBM PC Professional FORTRAN runs under the IBM Disk Operating System (DOS). It is certified at the full level by the federal government.

FORTRAN Compiler Version 2.00

Develop scientific and engineering applications. The FORTRAN Compiler Version 2.00 enables you to take advantage of the power of DOS to develop and run FORTRAN programs.

You can use the compiler to develop programs in a subset of FORTRAN-77, the popular computer language for scientific and engineering applications. These programs can then be compiled down to native object code and run on the IBM Personal Computer.

More benefits. This enhanced version of FORTRAN provides additional operating benefits as well. For example, you can:

- Develop applications that run independently or with the IBM 8087 or 80287 Math Co-processors
- Use list-directed input/output devices
- Run applications using double-precision arithmetic and additional metacommands
- Create object code libraries using the library manager

Macro Assembler Version 2.00

Speed through programs. With Macro Assembler Version 2.00, you can develop and assemble programs written in assembler language. These may run several times faster than equivalent programs written in higher-level languages. Assembler-produced programs may be called from programs compiled in BASIC, FORTRAN, COBOL, C, and Pascal.

Machine code makes the difference. As on larger computers, programs written in assembler language are assembled into machine code that may run several times faster than equivalent BASIC Interpreter routines. Additionally, the assembler permits you to use more than 75 internal functions provided by DOS that can help you implement more complex programs.

Using Macro Assembler Version 2.00, you can:

- Take advantage of 80286-based IBM Personal Computers and IBM 8087 and 80287 Math Co-processors
- Create object code libraries using structured assembler language pre-processor and library manager
- Speed through lengthy applications with a more powerful linker

COBOL Compiler

Access COBOL programs in mainframe computers. The COBOL Compiler permits you to develop programs in COBOL, a language designed for business applications. Featuring an easy-to-use, English language-like construction, this COBOL is a subset of the popular ANSI 1974-level standard. It also includes an extension that supports color and screen formatting.

Pascal Compiler Version 2.00

Create and execute large programs. The Pascal Compiler Version 2.00 provides you with a system development environment for creation and execution of Pascal programs. Its structured programming facilities and extensive data structures make the compiler useful for large application programs in both scientific and instructional environments. You may also use it to build applications that will run independently or with the IBM 8087 or 80287 Math Co-processor.

APL Interpreter

A versatile, general-purpose, interpretive language. APL Interpreter enables you to write and edit your own programs in APL—a highly structured programming language—and apply them in commercial data processing, teaching, system design, and mathematical and scientific computing.

APL Interpreter requires the IBM 8087 Math Co-processor for the IBM PC and the IBM Personal Computer XT.™ The 80287 Math Co-processor is required for the IBM Personal Computer AT® System. These hardware options increase the speed of mathematical calculations.

™Personal Computer XT is a trademark of International Business Machines Corporation.
®Personal Computer AT is a registered trademark of International Business Machines Corporation.

Professional Color Graphics Tools

Create more effective communications. Visualize a detailed technical drawing . . . incorporate design revisions . . . enlarge, reduce, and even transmit sales charts or graphics to another PC or workstation. These are just some of the dynamic graphics capabilities that can make your work—and your workstation—more productive.

To help you take advantage of these capabilities, IBM offers a number of software products to aid in the development of these high-performance graphics applications. Designed primarily for application developers, these tools incorporate many of the standards now emerging in the graphics industry.

Support for your applications, your environment. These graphics tools also provide the productivity benefits of device independence and program portability. That means application developers can use these tools to design graphics applications for many environments and for a wide range of systems.

Graphics Development Toolkit Version 1.10

A flexible graphics tool. The Graphics Development Toolkit Version 1.10 is a device-independent program interface for developing graphics applications. It is an extended implementation of the Virtual Device Interface (VDI), a proposed industry standard.

The Toolkit allows you to create graphics software that remains independent of the graphic I/O devices supported. This gives the software a greater range of portability and compatibility. And it provides you with a greater range of choice in the selection of graphics hardware.

New features afford new opportunities. This enhanced version of the Graphics Development Toolkit offers you a number of additional benefits. These include improved performance, raster graphics capabilities, and the ability to run under TopView's multitasking environment.

The VDI also offers high-level language bindings for IBM PC BASIC Compiler, IBM PC Professional FORTRAN, IBM C Compiler, Lattice C,* Pascal Compiler, and Macro Assembler.

Use the Graphics Development Toolkit Version 1.10 to:

- Create complex images with graphics primitives and attributes such as line, arc, circle, line style, color, fill pattern, and pixel blocks
- Add graphics capabilities to IBM PC programming languages
- Use alpha text mode for document text capability
- Control keyboard, mouse, and joystick input devices

*This product was developed using the Lattice C Compiler, Version 2.0, developed by Lattice, Inc.

Graphical Kernel System

A powerful applications tool. The IBM Graphical Kernel System (GKS) is based on proposed ISO/ANSI standards to aid application programmers in understanding and using graphics methods. It can also be used by device manufacturers as a guide to graphics capabilities.

One of two basic interfaces within the proposed standards, GKS provides for improved productivity at the programmer level. The Virtual Device Interface (VDI), the other basic interface, exists at the device level.

A consistent interface to high-level languages. The GKS was designed to provide program portability between computer systems. It accomplishes this by achieving source code compatibility that provides a consistent interface to such high-level languages as:

- FORTRAN Compiler Version 2.00
- IBM PC Professional FORTRAN
- Lattice C
- Basic Compiler Version 2.00

Programs conforming to GKS specifications can become part of a subroutine library that can be combined to form new and more sophisticated programs. You can also use GKS support for input from five different types of devices: string, valuator, pick, choice, and locator.

Plotting System

Create professional-quality graphics. The IBM Plotting System provides a set of two-dimensional subroutines that allows you to create professional-quality bar charts, text charts, scatter diagrams, and more.

High-level language bindings. The Plotting System uses the Virtual Device Interface (VDI) to provide bindings to high-level languages such as BASIC, FORTRAN, and Lattice C Compiler. It also offers a rich set of functions. Among these are capabilities to:

- Create a wide variety of custom charts and graphs using the comprehensive set of default values
- Use the built-in chart-dimensioning procedure to ensure consistent and proportional spacing
- Plot a format, then use it over and over without extensive rewriting
- Display multiple charts or chart types on a single display screen

These enable even those programmers with little experience in graphics to use basic plotting functions and gain the efficiencies provided by the VDI.

Graphics Terminal Emulator

Access information from host systems. The Graphics Terminal Emulator provides your IBM Personal Computer with the characteristics of such popular terminals as the Tektronix* 401X family, elements of the Tektronix 410X color family, and the Lear Siegler ADM-3A* terminals. This opens the door to a vast library of graphics applications residing in host systems—without the need to buy costly or specialized terminals.

Using the Virtual Device Interface (VDI) and the Graphical File System, the Emulator provides you with access to local graphics I/O devices. This makes existing application output available on a wide range of graphics equipment. Communications is through a standard RS-232C port.

Added benefits. The Emulator offers additional benefits to programmers and application developers. For example, it enables you to:

- Access information stored in IBM System/370 as well as non-IBM host systems
- Speed through operations using the icon-driven interface
- Examine contents of files and directories without leaving the emulation mode

*Tektronix is a trademark of Tektronix, Inc.
Lear Siegler ADM-3A is a trademark of Lear Siegler, Inc.

Graphical File System

Simplified graphics applications. The Graphical File System is an implementation of the proposed ANSI Metafile Standard. It consists of two device drivers. The Metafile driver converts and stores information to the proposed standard. The Metafile interpreter provides interactive retrieval and/or re-creation of graphic images from Metafiles.

The Graphical File System acts as another output driver under the Virtual Device Interface (VDI). Both appear identical to applications. The program also enables you to take advantage of the VDI's high-level language bindings for FORTRAN Compiler Version 2.00, IBM PC Professional FORTRAN, Lattice C Compiler, and IBM BASIC Compiler Version 2.00.

Application Development Tools

Streamline programming tasks. If you create and edit programs on your personal computer from IBM, you should know about the many IBM application development tools available.

Among these, you'll find such offerings as TopView Programmer's ToolKit Version 1.10—a tool to help you make the most of TopView's powerful multitasking and windowing capabilities; IBM Personal Computer XENIX® Software Development System—a versatile program to help you design your own; plus Professional Debug Facility, Professional Editor, EZ-VU Runtime Facility, and other powerful aids.

Whether you are a first-time programmer or skilled data processing user, you'll find a wide range of IBM application development tools to help you program more quickly. . . more easily. . . more productively.

® XENIX is a registered trademark of Microsoft Corporation.

TopView Programmer's ToolKit Version 1.10

Create your own TopView applications. TopView Version 1.10 is a powerful organizational tool that enables you to divide screens into "overlapping" windows so you can work on several programs at once. TopView Programmer's ToolKit Version 1.10 is a programming tool that helps you design your own TopView applications.

This enhanced ToolKit offers additional calls for increased flexibility. It also provides improved guidelines, utilities, and system interfaces for creating applications that take advantage of TopView's diverse capabilities. The ToolKit even permits you to custom-design applications that support a mouse or other pointing device.

An open window on increased productivity. With TopView Programmer's ToolKit Version 1.10, you can do all this and more:

- Create and store your own TopView windows, which can include Help screens, error messages, forms, and menus
- Take advantage of compatibility with a subset of the IBM Graphics Development Toolkit Version 1.10 drivers and the IBM PC Local Area Network Program Version 1.10 at the Redirector Level
- Use subroutine calls from one program to start another program
- Save time by electronically copying previously designed windows into subsequent application designs
- Revise your work quickly and easily
- Speak the same language as TopView by using the Macro Assembler interface defined in the ToolKit

IBM Personal Computer XENIX Software Development System Version 2.00

Design applications for PC DOS and IBM PC XENIX. IBM PC XENIX Software Development System Version 2.00 is a sophisticated programming package for developing application software. By using the product's C Compiler and the Macro Assembler, you can generate code suitable for both PC DOS and IBM PC XENIX environments.

A rich set of development tools. In addition to the C Compiler and Macro Assembler, the IBM PC XENIX Software Development System also provides a set of software development tools. These are derived from the UNIX™ System V Operating System, and they include interactive debugging, language translators, and source code management tools.

Multi-user, multitasking capabilities. The IBM PC XENIX Operating System is a prerequisite to the Software Development System. It offers support for memories up to three megabytes, and provides both multi-user and multitasking capabilities. This is especially useful in environments where several programmers are working together on a project.

The IBM PC XENIX Operating System enables up to three people to use a single IBM Personal Computer AT at the same time. In addition, it offers electronic mail and communications capabilities to local and remote systems. IBM PC XENIX is licensed for a maximum of eight users.

Take advantage of high-performance features. With the IBM PC XENIX Software Development System Version 2.00, you can:

- Use the C Compiler that is customized for the 80286 processor to support programs and data files as large as available memory
- Benefit from a powerful Assembler language that includes macro support
- Take advantage of the Source Code Control System (SCCS). This facilitates control over text files such as documents, legal contracts, briefs, manuals, or source code in any language, by maintaining an audit trail of revisions
- Keep track of any module that depends upon other modules, or automate the generation of complex systems of files or programs with the command "make"
- Check C source code with the program "lint"
- Speed through debugging tasks with "adb," an interactive program debugging tool
- Use a lexical analyzer and compiler-compiler "lex" and "yacc"

™UNIX is a trademark of AT&T Bell Laboratories.

Voice Communications Applications Program Interface Reference

Develop programs using advanced speech functions. The IBM PC Voice Communications Applications Program Interface (VCAPI) Reference can help you create and run applications for the IBM PC Voice Communications Adapter. Among these are programs that emulate modems, recognize, record, and play back voice, synthesize speech, and dial telephone numbers.

Here's how it works. Using the VCAPI Reference, you can initiate voice communications adapter functions by issuing commands at the VCAPI level. This enables you to:

- Develop programs that connect one telephone, one or two telephone lines, or one microphone and one speaker to an IBM Personal Computer
- Create applications that can generate synthetic speech and "read" text and data through a connected telephone, telephone line, or speaker
- Translate spoken commands into PC commands
- Benefit from support of Asynchronous Communications protocols at data transmission rates of 110, 300, or 1200 bits per second

To use the VCAPI Reference you should be familiar with PC Assembly language, a high-level programming language, and how the two interact.

Professional Debug Facility

High-quality, high-performance code. Professional Debug Facility is a state-of-the-art debugging package. It was designed to provide assembler-language programmers with tools that can significantly reduce debug time while producing high-quality code with high-performance characteristics.

Two powerful tools. The Professional Debug Facility consists of two powerful utilities. The Resident Debug Tool has extensive window capabilities to help you trace through or disassemble code. The Disk Repair Utility lets you look at all areas of DOS-formatted disks or diskettes. Professional Debug also includes a Non-Maskable Interrupt Card that is installed in one of your system's expansion slots and enables you to exit the user program and invoke the Resident Debug Tool.

EZ-VU Runtime Facility

A dialog management program. EZ-VU Runtime Facility provides you with a conversational interface to your application programs. Using its sophisticated, pre-defined screens, you can:

- Send commands to and receive information from application programs
- Display previously defined panels on request
- Invoke a variety of selection panels or dialog functions
- Run programs written with IBM PC BASIC, FORTRAN, COBOL, and Pascal Compilers, and the Macro Assembler
- Take advantage of the TopView multitasking environment

The EZ-VU Runtime Facility is required to run the dialogs and products you have developed using the EZ-VU Development Facility.

EZ-VU Development Facility

An interactive programming tool. The EZ-VU Development Facility is a screen generator and editor that produces screens for the EZ-VU Runtime Facility. It provides you with the capability to create more sophisticated interactive applications—with less coding effort.

EZ-VU Development Facility helps you:

- Create screens that use fields, function keys, and colors for emphasis
- Define fields for editing, translating, range checking, or verifying by EZ-VU Runtime Facility
- Copy and modify existing screens
- Include these screens in programs written with IBM PC BASIC, FORTRAN, COBOL, or Pascal Compilers, and the Macro Assembler

SORT

High-performance data sorting. IBM Personal Computer SORT is a flexible, general-purpose sorting program. It enables you to sort records from data files, merge multiple input files, or selectively include or exclude records. SORT can work with most data types and file organizations used by languages supported by the IBM Disk Operating System (DOS): BASIC, FORTRAN, COBOL, and Pascal.

Professional Editor

A comprehensive editor. Professional Editor is a full-screen editor designed for professional programmers and others who have complex program- and text-editing needs. This versatile software package makes maximum use of your IBM Personal Computer's keyboard and display capabilities to help streamline program and text development.

Technical Reference Manuals

Valuable resources provide a wealth of information. Software products are only part of the programming story. IBM also makes available a complete set of technical references—The IBM PC Technical Reference Library.

These information-packed manuals represent a valuable resource for programmers, application developers, anyone who wants to know the "inside story" on Personal Computers from IBM.

Hardware Reference Manuals

Take a closer look at hardware. IBM PC Technical Reference Manuals can provide you with a detailed look at these systems and products:

- IBM PC*jr*™
- IBM Personal Computer
- IBM PC XT and *Portable* Personal Computer
- IBM Personal Computer AT
- IBM Personal Computer Network

™IBM PC*jr* is a trademark of International Business Machines Corporation.

Options and Adapters Manual Updates

Get the latest information. In addition to hardware manuals, IBM also offers the following updates for the Options and Adapters Technical Reference Manual:

- Enhanced Graphics Adapter
- Engineering/Scientific
- IBM Personal Computer AT
- 30MB Fixed Disk Drive
- Cluster Adapter
- 256KB Memory Expansion
- Voice Communications Adapter

System Requirements

The System Requirements Chart on the following pages indicates the hardware and software you need to run each program described in this brochure.

The chart lists programs in alphabetical order and notes the pages on which they are described. Find the program you want and read all the way across the chart to check its requirements.

Program Name	Page No.	Supported Systems	Minimum Memory Required	Lowest DOS Version Required
APL Interpreter	6	PC, XT, PPC, AT	128KB	2.10*
BASIC Compiler Version 2.00	3	PC, XT, PC*jr*, PPC, AT	128KB	2.10*
C Compiler	3	PC, XT, PPC, AT	256KB	2.10*
For stand-alone				
For PC Network		PC, XT, PPC, AT	512KB	3.10*
COBOL Compiler	5	PC, XT, PPC, AT	64KB	1.00*
EZ-VU Runtime Facility and EZ-VU Development Facility	15	PC, XT, PC*jr*, PPC, AT	128KB	2.00*
FORTRAN Compiler Version 2.00	4	PC, XT, PPC, AT	160KB	2.00*
Graphical File System	10	PC, XT, PPC, AT	256KB	2.10*
Graphical Kernel System (GKS)	9	PC, XT, PPC, AT	256KB	2.10*
Graphics Development Toolkit Version 1.10	8	PC, XT, PC*jr*, PPC, AT	128KB	2.10*
Graphics Terminal Emulator	10	PC, XT, PPC	256KB	2.10*
IBM PC Professional FORTRAN	4	PC, XT, PPC, AT	192KB**	2.10*
IBM Personal Computer XENIX Software Development System Version 2.00	13	AT	512KB	Not applicable
IBM Voice Communications Application Program Interface Reference	14	PC, XT, AT	256KB	2.10*
Macro Assembler Version 2.00	5	PC, XT, PC*jr*, PPC, AT	96KB	1.10*
Pascal Compiler Version 2.00	5	PC, XT, PPC, AT	160KB	2.00*
Plotting System	9	PC, XT, PPC, AT	128KB	2.00*
Professional Debug Facility	14	PC, XT, PPC, AT	128KB	—
Professional Editor	16	PC, XT, PC*jr*, PPC, AT	64KB	1.00*
Sort	16	PC, XT, PPC, AT	128KB	1.10*
TopView Programmer's ToolKit Version 1.10	12	PC, XT, PPC, AT	320KB	2.10*

PC—IBM Personal Computer
XT—IBM Personal Computer XT
PC*jr*—IBM PC*jr*
PPC—IBM *Portable* Personal Computer

Required Drives	Supported Displays**	IBM Printer***	Other Requirements and Comments
One diskette drive.	M, C, EC, TV	Optional	An IBM 8087 Math Co-processor is required (80287 for the IBM Personal Computer AT). A compatible 80-column monitor is supported.
One double-sided diskette drive.	M, C, EC, *jr*C, TV	Optional	Additional memory and two double-sided diskette drives are recommended.
Two double-sided diskette drives (or one double-sided diskette drive and one fixed disk drive).	M, C, EC, PG	Optional	A minimum of 320KB of user memory is required when using either symbolic debug or MAKE library options. Performance can be enhanced with at least 384KB of memory.
Two double-sided diskette drives (or one double-sided diskette drive and one fixed disk drive).	M, C, EC, PG	Optional	Performance can be enhanced with at least 640KB of memory.
Two diskette drives.	M, C, EC	Optional	A minimum of 128KB of memory is required for fixed disk storage.
One double-sided diskette drive.	M, C, EC	Supported	A compatible 80-column monitor is supported.
Two diskette drives (or one diskette drive and one fixed disk drive).	M, C, EC, TV	Recommended	A compatible 80-column monitor is recommended.
Two 360KB diskette drives (or one 1.2MB diskette drive).	M, C, EC, PG, TV	Supported	The program requires one of the following: IBM PC BASIC Compiler 1.00 or higher, IBM PC FORTRAN Compiler 2.00 or higher, IBM PC Professional FORTRAN Compiler 1.00, or Lattice C Compiler.
Two 360KB diskette drives (or one 1.2MB diskette drive).	M, C, EC, PG, TV	Supported	The program requires one of the following: IBM PC BASIC Compiler 1.00 or higher, IBM PC FORTRAN Compiler 2.00 or higher, IBM PC Professional FORTRAN Compiler 1.00, or Lattice C Compiler.
One double-sided diskette drive (360KB or 1.2MB).	M, C, EC, PG, TV	Supported	The program requires one of the following: IBM PC BASIC Compiler 1.00 or higher, IBM PC FORTRAN Compiler 2.00 or higher, IBM PC Professional FORTRAN Compiler 1.00, or Lattice C Compiler.
One double-sided diskette drive (360KB or 1.2MB).	M, C, EC, PG, TV	Supported	A modem is required. An RS-232C serial port is required.
One fixed disk drive and one 360KB or 1.2MB diskette drive (or two 360KB or 1.2MB diskette drives).	M, C, EC, PG	Optional	IBM 8087 or IBM 80287 Math Co-processor, as appropriate, is required. A compatible 80-column monitor is supported.
One high-capacity diskette drive and one fixed disk drive.	M, C, EC, PG	Recommended	The IBM PC XENIX Operating System Version 2.00 is required.
Two double-sided diskette drives (or one double-sided diskette drive and one fixed disk drive).	M, C	Optional	The IBM PC Voice Communications Adapter and Voice Communications Operating Subsystem are required. A telephone and microphone are optional.
One double-sided diskette drive.	M, C, EC, *jr*C, TV	Optional	A minimum of 128KB of memory is required for use with DOS 2.00 or higher. A compatible 80-column monitor is recommended.
Two diskette drives (or one diskette drive and one fixed disk drive).	M, C, EC, PG	Recommended	An IBM 8087 Math Co-processor is supported but not required. An 80-column monitor is recommended.
Two 360KB diskette drives (or one 1.2MB diskette drive).	M, C, EC, PG TV	Optional	The program requires one of the following: IBM PC BASIC Compiler 1.00 or higher, IBM PC FORTRAN Compiler 2.00 or higher, IBM PC Professional FORTRAN Compiler 2.00, or Lattice C Compiler.
One diskette drive; fixed disk storage is supported.	M, C, EC	Optional	The IBM 8087 or 80287 Math Co-processor is supported but not required. A compatible 80-column monitor is supported.
One diskette drive; fixed disk storage is supported.	M, C, EC, *jr*C	Optional	A minimum of 128KB is required for use with the IBM PC*jr* or for fixed disk storage. A compatible 80-column monitor is supported.
One double-sided diskette drive.	M, C	Optional	DOS 2.00 or higher is required for fixed disk storage.
One double-sided diskette drive and one fixed disk drive (or two double-sided diskette drives).	M, C, EC, PG	Optional	The Enhanced Color Display is supported in normal color mode, the Professional Graphics Display in the emulator mode. A minimum of 512KB of memory is recommended but not required. A compatible 80-column monitor is supported.

AT— IBM Personal Computer AT

M—IBM Monochrome Display
C—IBM Color Display

EC—IBM Enhanced Color Display
***jr*C**—IBM PC*jr* Color Display

PG—IBM Professional Graphics Display
TV—Television set

NOTES

* The chart below indicates the DOS versions that are supported on IBM's personal computer systems.

PC IBM Personal Computer

XT IBM Personal Computer XT

PC*jr* IBM PC*jr*

PPC IBM *Portable* Personal Computer

AT IBM Personal Computer AT

DOS Version	PC	XT	PC*jr*	PPC	AT
1.00	•				
1.10	•				
2.00	•	•			
2.10	•	•	•	•	
3.00	•	•	•	•	•
3.10	•	•	•	•	•
3.20	•	•	•	•	•

DOS 3.00 does not support the 30MB IBM Personal Computer AT. DOS 2.00 or higher is required for fixed disk storage. DOS 3.10 or higher is required for operation on the IBM PC Network.

** The following symbols appear in the System Requirements Chart to indicate the displays—and corresponding adapters—that can be used with each program listed in the chart.

M IBM Monochrome Display—requires the IBM Monochrome Display and Printer Adapter or IBM Enhanced Graphics Adapter; not compatible with the IBM *Portable* Personal Computer or IBM PC*jr*.

C IBM Color Display—requires the IBM Color/Graphics Monitor Adapter or IBM Enhanced Graphics Adapter.

EC IBM Enhanced Color Display—requires the IBM Enhanced Graphics Adapter.

***jr*C** IBM PC*jr* Color Display—requires no additional hardware; compatible only with the IBM PC*jr*.

PG IBM Professional Graphics Display—requires the IBM Professional Graphics Controller.

TV Television set—requires an RF Modulator or IBM PC*jr* Connector for TV.

*** For specific application printer support, contact your Authorized Dealer, IBM Product Center, or IBM marketing representative.

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